

different types of detectors. More specifically, as disclosed in the specification as filed, a biological signature is an identifying characteristic that can be used to distinguish a biological material from other material. (Specification, page 50, line 23-page 51, line 2.) Many such signatures are possible, and many types of detectors can be employed. The specification clearly discloses the following types of signatures that can be detected: an autofluorescence signature (i.e., a characteristic fluorescent spectra emitted by a biological material), a Raman spectral signature (i.e., a characteristic Raman spectra emitted by the biological material), an infrared absorption signature (i.e., a characteristic infrared absorption spectra), and a mass spectra signature (i.e., a characteristic mass spectra). (See applicants' specification, page 14, lines 21-page 15, line 2.) One of ordinary skill in the art would recognize that detection of an autofluorescence signature requires a fluorescence detector, detection of a Raman spectral signature requires a Raman spectrometer, detection of an infrared absorption signature requires an infrared absorption spectrometer, and detection of a mass spectra signature requires a mass spectrometer. (See applicants' specification, page 15, lines 3-6.) Thus, Claim 5 recites specific detectors, while Claim 7 recites specific signatures. As there is no evidence that an artisan of ordinary skill would be unable to ascertain the scope of Claims 5 and 7, applicants respectfully request that the rejection be withdrawn.

With respect to Claim 24, the Examiner indicates that Claim 24 is indefinite because it contains "autofluorescence," which is also recited in Claim 23. Accordingly, applicants have amended Claim 24 to delete the recitation of "an autofluorescence" and respectfully request that the Examiner withdraw her rejection of Claim 24.

Claims Rejected Under 35 U.S.C. § 102

The Examiner has rejected Claims 1, 4-6, and 32-34 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,987,286 (Allen, hereinafter referred to as "Allen '286").

The Examiner has also rejected Claims 21-24 and 37-38 under 35 U.S.C. § 102(b) as being anticipated by U.S. Publication No. 2002/0124664 (Call et al., hereinafter referred to as "Call").

The Examiner has rejected Claims 1, 4-6, and 32-34 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,949,147 (Uziel et al., hereinafter referred to as "Uziel '147").

The Examiner has also rejected Claims 1, 4-6, 32-34, and 43-44 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,908,567 (Uziel et al., hereinafter referred to as "Uziel '567").

1 The Examiner has rejected Claims 1, 4-6, and 32-34 under 35 U.S.C. § 102(c) as being
2 anticipated by U.S. Patent No. 6,805,751 (Allen, hereinafter referred to as "Allen '751").

3 The Examiner has rejected Claims 1, 3-7, and 32-33 under 35 U.S.C. § 102(c) as being
4 anticipated by Int'l Published Application No. WO 03/089907 (Bryden et al., hereinafter referred to
5 as "Bryden").

6 The Examiner has rejected Claims 1, 3-7, 29, 30, 33-36 and 43-45 under 35 U.S.C. § 102(c)
7 as being anticipated by Int'l Published Application No. WO 03/089661 (Murray et al., hereinafter
8 referred to as "Murray").

9 In the interest of reducing the complexity of the issues for the Examiner to consider in this
10 response, the following discussion focuses on independent Claims 1 and 21. The patentability of each
11 remaining dependent claim is not necessarily separately addressed in detail. However, applicants'
12 decision not to discuss the differences between the cited art and each dependent claim should not be
13 considered as an admission that applicants concur with the Examiner's conclusion that these dependent
14 claims are not patentable over the disclosure in the cited references. Similarly, applicants' decision not
15 to discuss differences between the prior art and every claim element, or every comment made by the
16 Examiner, should not be considered as an admission that applicants concur with the Examiner's
17 interpretation and assertions regarding those claims. Indeed, applicants believe that all of the dependent
18 claims patentably distinguish over the references cited. In any event, a specific traverse of the rejection
19 of each dependent claim is not required, since dependent claims are patentable for at least the same
20 reasons as the independent claims from which the dependent claims ultimately depend.

21 Patentability of Independent Claim 1 over Allen (both Allen '286 and Allen '751)

22 Significant differences exist between the recited subject matter and the cited art because the
23 cited art does not teach or suggest a detector as recited in the third paragraph and does not teach or
24 suggest a regenerable solid collection surface. The Examiner has asserted that both Allen '286 and
25 Allen '751 individually teach all of the aspects recited in applicants' independent Claim 1. However,
26 applicants respectfully submit that in light of applicants' amendments to Claim 1, the Allen
27 references are no longer analogous art. Applicants have amended Claim 1 to modify the scope of the
28 claim. Claim 1 no longer simply recites a device that removes particles from a surface. Instead,
29 Claim 1 is now directed to an *air sensor* configured to *collect particles* from the air *and to determine*
30 if these collected particles represent a biological threat.

Allen's devices are not related to the art of air samplers or air sensors. Rather, Allen's devices are cleaning tools, specifically designed to remove particles from critical surfaces. Allen's technology is specifically configured to be used in the manufacturing of electronic devices, where the presence of unwanted particles on surfaces can lead to manufacturing defects.

The Examiner correctly states that Allen discloses removing particles from a surface. However, Allen's devices do not include a collection surface specifically configured to remove particles from an air stream as a result of impaction of the particles with a surface. In other words, Allen's devices do not include any structure for directing air toward an impaction surface in order to intentionally form a deposit of particles thereon.

Even more significantly, Allen's cleaning devices do not include a *detector configured to determine if the immobilized airborne particles represent a biological threat*. Indeed, since Allen's devices are designed to remove *all* particles (and not just biological particles), there would be no benefit in modifying Allen's devices to distinguish between biological particles and non-biological particles.

Thus, the air sensor of Claim 1 clearly distinguishes over Allen because the collection surfaces are utilized for very different purposes (i.e., in applicants' claim recitation, the collection surface is used to collect particles from an air stream) and Allen does not teach or suggest any equivalent of a detector. Further, none of the cited art teaches or suggests the modifications required to achieve an equivalent of the sensor recited in applicants' Claim 1.

Accordingly, the rejection of independent Claim 1 under 35 U.S.C. § 102(b) and under 35 U.S.C. § 102(e) should be withdrawn. Because dependent claims include all of the elements of the independent claim from which the dependent claims ultimately depend, dependent Claims 4-6 and 32-34 are patentable for at least the reasons discussed above in regard to independent Claim 1, and the rejection of dependent Claims 4-6 and 32-34 under 35 U.S.C. § 102(b) and under 35 U.S.C. § 102(c) should also be withdrawn.

Patentability of Independent Claim 1 over Uziel (both Uziel '567 and Uziel '147)

Significant differences exist between the recited subject matter now recited and the cited art, because the cited art does not teach or suggest a detector as recited in the third paragraph of Claim 1. This detector is configured to continuously determine if the immobilized airborne particles represent a biological material potentially harmful to life.

1 The Examiner has asserted that both Uziel references disclose all of the aspects of applicants'
2 Claim 1. Applicants respectfully disagree – particularly following the amendments submitted above.
3 Significantly, due to applicants' amendment that clarifies that the claimed device is an air sampler,
4 the Uziel references *are not* analogous art. Claim 1 is now directed to an air sensor configured to
5 collect particles from the air and to determine if such collected particles represent a biological threat.

6 Uziel's devices are not related to the art of air samplers or air sensors. Instead, Uziel's
7 devices are cleaning tools, specifically designed to remove particles from critical surfaces. Uziel's
8 technology is specifically configured to be used in the manufacturing of electronic devices, where the
9 presence of unwanted particles on surfaces can lead to manufacturing defects.

10 The Examiner indicates that Uziel discloses a detector configured to determine positional
11 coordinates of particles on a surface, so that a particle removing component can be used to remove such
12 particles. However, a detector configured to determine the position of a particle is not equivalent to a
13 detector *"configured to determine if the immobilized airborne particles represent a potential*
14 *biological threat by sensing a biological signature."* Nor is there any evidence that an artisan of
15 ordinary skill in the art would have been motivated to modify either Uziel reference or incorporate
16 such a detector into the devices disclosed by Uziel '147 and Uziel '567, since such a detector would
17 not appear to enhance the surface-cleaning technique disclosed by the cited art, particularly because
18 for cleaning critical surfaces that should be particle-free (such as in electronic and semi-conductor
19 devices), there simply is no need to distinguish biological particles from non-biological particles, or
20 potentially threatening biological particles from innocuous biological particles.

21 Accordingly, the rejection of independent Claim 1 under 35 U.S.C. § 102(e) should be
22 withdrawn. Because dependent claims include all of the elements of the independent claim from which
23 the dependent claims ultimately depend, dependent Claims 4-6 and 32-34 and 43-44 are patentable for
24 at least the reasons discussed above in regard to independent Claim 1, and the rejection of dependent
25 Claims 3-7 and 32-33 and 43-44 under 35 U.S.C. § 102(e) should also be withdrawn.

26 Patentability of Independent Claim 1 over Bryden

27 Significant differences exist between the recited subject matter in this claim and the cited art
28 because the cited art does not teach or suggest a *surface regenerator* configured to automatically
29 regenerate a regenerable solid collection surface by removing particles from the regenerable solid
30

collection surface, such that once regenerated, the regenerable collection solid surface can be reused to collect additional particles from the air.

In supporting the conclusion that Bryden discloses a surface regenerator, the Examiner has cited paragraph 0033, which is reproduced below:

Once the collection of the coagulated particles is performed, the **excess of the fluid** accumulated on the solid impaction surface 26 formed as a porous membrane, is sucked in by a vacuum means 50 juxtaposed with the membrane's bottom. Alternatively, a blower⁵⁴ facing the bare tape can blow the **excess of the fluid** off this surface. (Emphasis added.)

Applicants respectfully disagree with the Examiner that Bryden discloses the equivalent of applicants' surface regenerator, because as indicated in the citation reproduced above, Bryden discloses removing an unwanted liquid from a surface, and not particles. The disclosure of paragraph 0033 must be taken in context. Bryden's overall concept is to improve particle collection efficiency by introducing an aerosol into the air stream carrying the particles, to cause the particles to "clump" together, making them easier to capture. In paragraph 0032, Bryden specifically teaches that some liquids that can be beneficially added to the aqueous aerosol are beneficial for certain particles (such as growth mediums for biological particles), but can actually interfere with an analytical process. So, in paragraph 0033 Bryden teaches that any excess fluid that might contain materials that would interfere with the analysis of the collected particles can be removed from the collection surface. Such a removal process in Bryden is NOT equivalent to the elements recited in Claim 1, which requires that the particles be analyzed **while on the collection surface**, and that the collection surface be cleaned to remove previously collected particles to prevent the previously collected particles from contaminating a subsequent sample that is collected.

Bryden teaches that particles deposited on a collection surface can be removed using a laser (see paragraph 0027) and that the vaporized particles are then sucked into an analytical unit. In this case, regardless of whether the surface is sufficiently clean to prevent contamination of subsequently collected particles, the analysis of the particles taught by Bryden does NOT occur on the collection surface.

Furthermore, there is no basis for concluding that Bryden teaches or suggests that particles be collected on a collection surface that is cleaned for reuse. Bryden specifically discloses that preferred collection surfaces include pools of liquids and solid surfaces. With respect to solid surfaces (and applicants have now recited that their collection surface is a **solid** surface), Bryden specifically

discloses the use of a tape (see paragraphs 0034 (bare tape) and 0036 (tape impactor 26)). The artisan of ordinary skill will recognize that a tape-based collection surface is advanced after a sample is collected, to expose a fresh portion of the tape before a new sampling cycle is initiated. In contrast, in applicants' device, the original collection surface is regenerated by cleaning, and then reused after all previously collected particles are removed.

Thus, the air sensor of applicants' Claim 1 is clearly distinguished over Bryden in that the collection surfaces are utilized differently (i.e., in applicants' device, the same surface is cleaned and reused). Further, that Bryden does not teach or suggest that collected particles are analyzed while on the collection surface. Also, the cited art does not teach or suggest any modification that would be required to achieve an equivalent sensor, nor would such a modification appear to provide any obvious benefit to Bryden.

Accordingly, the rejection of independent Claim 1 under 35 U.S.C. § 102(e) should be withdrawn. Because dependent claims include all of the elements of the independent claim from which the dependent claims ultimately depend, dependent Claims 3-7 and 32-33 are patentable for at least the reasons discussed above in regard to independent Claim 1, and the rejection of dependent Claims 3-7 and 32-33 under 35 U.S.C. § 102(e) should also be withdrawn.

Patentability of Independent Claim 1 over Murray

Significant differences exist between the recited subject matter and the cited art because the cited art does not teach or suggest a *surface regenerator* that both automatically removes particles from a regenerable solid collection surface AND regenerates the solid collection surface such that particles collected before the regeneration are substantially no longer present to contaminate particles collected after the regeneration as recited in the second subparagraph. In addition, the cited art does not teach or suggest a detector that makes the determination of whether or not the particles are potentially harmful to life *while* the particles are disposed on the regenerable solid collection surface.

Significantly, Murray discloses that collected particles must be removed from either a liquid or solid collection surface *before* they are analyzed. Claim 1 specifically recites that the detector is configured to analyze particles for a biological signature *while the particles are still on the collection surface*. In contrast, Murray discloses in paragraph 0037 that the liquid sample is delivered through a controllable pinch valve to an optical cell 50. Further, Murray discloses in paragraph 0039 that the concentrated sample is delivered to the cell 50. Finally, Murray discloses in paragraph 0040 that

cell 50 is where analysis of the sample takes place. Thus, the detector in Murray is *NOT* configured to perform its analysis *while* the particles are disposed on a solid collection surface, because Murray has taught that the sample is transported *away from* collector 38 for analysis.

Further, in the context of disclosing that particles are removed from the collection surface *before* analyzing the particles, Murray does not teach or suggest that once a sample of particles has been removed from the collection surface, the solid surface is ready to collect additional particles *because it is substantially free of particles previously collected*. In other words, there does not appear to be any evidence to conclude that Murray's device regenerates the collection surface or reuses the same collection surface for a subsequent particle deposition, particle removal, and analysis cycle. Indeed, Murray specifically discloses using a tape as a collection surface (*a solid surface such as a bare or coated with mineral oil/vacuum grease tape, paper, metal or any other suitable solid surface*; see paragraph 0036). One of ordinary skill in the art would readily recognize that when using a tape type collection surface, once a sample has been collected the tape is advanced to provide a fresh deposition surface.

Thus, the air sensor of Claim 1 is distinguishable over Murray in that analysis of the collected particles occurs in applicants' recitation while the particles are on the collection surface, and because the same surface is cleaned (so that no previously collected particles contaminate a subsequently collected batch of particles) and reused. The cited art does not teach or suggest a modification required to achieve an equivalent sensor.

Accordingly, the rejection of independent Claim 1 under 35 U.S.C. § 102(e) should be withdrawn. Because dependent claims include all of the elements of the independent claim from which the dependent claims ultimately depend, dependent Claims 3-7, 29-30, 33-36 and 43-45 are patentable for at least the reasons discussed above in regard to independent Claim 1, and the rejection of dependent Claims 3-7, 29-30, 33-36 and 43-45 under 35 U.S.C. § 102(e) should also be withdrawn.

Patentability of Independent Claim 21

Significant differences exist between the recited subject matter and the cited art because the cited art does not teach or suggest that the particles are analyzed while they are still deposited on the collection surface as recited in the second paragraph of Claim 21.

The Examiner has rejected Claims 21-24 and 37-38 under 35 U.S.C. § 102(b) as being anticipated by Call. The Examiner asserts that Call discloses an equivalent method of depositing

1 particles on a collection surface, detecting a biological signature, and regenerating the collection
2 surface. Applicants respectfully disagree for the following reasons.

3 Independent Claim 21 has been amended to make it clear that the particles are analyzed while
4 they are still deposited on the collection surface. The method disclosed by Call is distinguishable, in
5 that Call's method requires that the particles be *removed from the collection surface* to provide a
6 liquid sample that is then used to analyze the particles in the liquid solution. This point is made clear
7 in paragraph [0122] of Call, which states in part:

8
9 In summary, this embodiment of the present invention conveys mail to be
10 analyzed for chemical and biological agents into a negative pressure
11 containment chamber, which includes a HEPA filtration system, a mechanism
12 for opening letters or other items of mail, and pressurized air jets for
13 aerosolizing any particulates that might be on the surface or contained within
14 the items of mail. A triggering sampler continuously monitors the level of
15 particulates (or quality of particulates) within the sampled air stream, and when
16 required, *a detection sampling system takes a wet sample of the particulates
17 for detailed analysis*. If desired, an archiving sampler is provided to collect
18 and archive dry samples for later analysis, such as to facilitate a forensic
19 investigation. Optionally, a decontamination fluid is sprayed inside the
20 containment chamber by decontamination means to decontaminate the interior
21 of the chamber, if potentially threatening contamination is detected in a parcel
22 being processed. (Emphasis added.)

23
24 The triggering sampler in Call is implemented using a particle counter that detects particles
25 entrained in an air stream. The detection sampler of Call also includes a collection surface
26 configured to collect particles from the air; however, the collected particles *are not* analyzed while
27 still deposited on the collection surface. Instead, in Call, the particles are washed off the collection
28 surface to obtain a wet sample, which is analyzed using detectors configured to analyze particles in
29 solution. The technique disclosed by Call is not equivalent to that recited in Claim 21, nor is there
30 any basis for concluding that the changes required to make the method disclosed by Call equivalent
to the method recited in Claim 21 would have been obvious to an artisan of ordinary skill in the art or
that there would have been motivation to do so.

Specifically, none of the cited art appears to teach or suggest that any benefit would be obtained
by analyzing the particles while the particles remain on the collection surface, as opposed to removing

1 the particles for analysis in a solution. Thus, there appears to be no reasonable basis for modifying
2 Call's method to achieve an equivalent to the recitation in applicants' claim.

3 Accordingly, the rejection of independent Claim 21 under 35 U.S.C. § 102(b) should be
4 withdrawn. Because dependent claims include all of the elements of the independent claim from which
5 the dependent claims ultimately depend, dependent Claims 21-24 and 37-38 are patentable for at least
6 the reasons discussed above in regard to independent Claim 21, and the rejection of dependent
7 Claims 21-24 and 37-38 under 35 U.S.C. § 102(b) should also be withdrawn.

8 Claims Rejected Under 35 U.S.C. § 103

9 The Examiner has rejected Claim 31 under 35 U.S.C. § 103(a) as being unpatentable over
10 Bryden in view of Lin et al (U.S. Patent No. 6,193,587, hereinafter referred to as "Lin").

11 Claim 31 is dependent upon Claim 1. Because dependent claims include all of the elements of
12 the independent claim from which the dependent claims ultimately depend, dependent Claim 31 is
13 patentable for at least the reasons discussed above in regard to independent Claim 1, and the rejection
14 of dependent Claim 31 under 35 U.S.C. § 103(a) should also be withdrawn.

15 Claims Provisionally Rejected under Obviousness-Type Double Patenting

16 The Examiner has provisionally rejected Claims 1 and 21 based on the judicially created doctrine
17 of non-statutory double patenting, asserting that such claims are unpatentable over Claims 44 and 45 of
18 copending application 10/791,057. The Examiner notes such a rejection can be overcome by the filing of
19 a terminal disclaimer. Such a terminal disclaimer has been submitted concurrently herewith, and the
20 rejection should be withdrawn.

21 Accordingly, all of the claims now submitted define patentable subject matter that is neither
22 anticipated nor obvious in view of the prior art cited. The Examiner is thus requested to pass the present
23 patent application to issue in view of the amendments and the remarks submitted above. If there are any
24 questions that might be addressed by a telephone interview, the Examiner is invited to telephone the
25 undersigned attorney, at the number listed below.

26 Respectfully submitted,

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MCK/RMA:clm